CLAIMS

1. A doubly balanced wide band mixer for a high frequency upconverter comprising:

an insulated substrate;

a local oscillator balun comprising first and second annular foil elements

5 juxtaposed on opposite sides of said substrate;

electrical interconnections interconnecting said first and second foil elements on said substrate;

an IF balun comprising third and fourth annular foil elements juxtaposed on opposite sides of said substrate and displaced from said first and second foil elements; and

RF switching means coupled between said local oscillator balun and said IF balun.

2. The mixer of claim 1, further comprising:

a buffer amplifier and a balun on said substrate for coupling a local oscillator signal to said local oscillator balun.

3. The mixer of claim 2, further including DC isolation capacitances in said local oscillator balun; and

means for supplying DC operating potential to said buffer amplifier through said balun to said local oscillator balun.

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- 4. The mixer of claim 3, further including: gaps in said first foil element; and said DC isolation capacitances being connected across said gaps.
- 5. The mixer of claim 4, wherein said RF switching means comprises a mixer diode network including a plurality of reverse biasing R/C circuits.
- 6. The mixer of claim 4, wherein said RF switching means comprises MESFET switches.
 - 7. A doubly balanced mixer for a high frequency upconverter comprising: an insulated substrate;

a local oscillator balun having a split annular first foil element on one side of said substrate and an open annular second foil element on the opposite side of said substrate;

electrical connections interconnecting said split annular first foil element and said open annular second foil element;

a buffer amplifier and a balun on said substrate for coupling an oscillator signal to said local oscillator balun;

an IF balun comprising third and fourth annular foil elements juxtaposed on opposite sides of said substrate in mutual coupling relationship with each other; and

RF switching means coupled between said local oscillator balun and said IF balun.

8. The mixer of claim 7, further including isolation capacitances in said local oscillator balun; and

means for supplying DC operating potential to said buffer amplifier through said balun and a portion of said local oscillator balun.

- The mixer of claim 8, further including:
 gaps in said first foil element; and
 said DC isolating capacitances being connected across said gaps.
- 10. The mixer of claim 9 wherein said RF switching means comprises:
- a mixer diode network; and
- a plurality of R/C circuits for reverse biasing said mixer diode network.
- 11. The mixer of claim 9, wherein said RF switching means comprises a pair of MESFET switches.
 - 12. A double balanced mixer comprising:
 - a source of a symmetrical local oscillator signal;
 - a switching circuit controlled by said local oscillator signal;
 - a source of RF signal; and

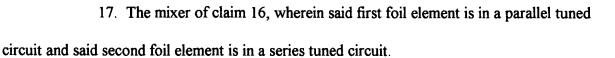
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- a printed output circuit having a wideband response for receiving said RF signal and connected to said switching circuit for producing a narrow band IF output signal comprising the frequency difference between said local oscillator signal and said RF signal.
- 13. The mixer of claim 12, wherein said output circuit includes parallel tuned elements exhibiting said wideband response and series tuned elements exhibiting said narrow band response.
- 14. The mixer of claim 12 wherein said switching circuit comprises first and second switches, each having a control terminal connected to receive said local oscillator signal, an output terminal and a third terminal connected to ground; said first and second switches being alternately turned on and off in response to said local oscillator signal.
- 15. The mixer of claim 14, wherein said first and second switches comprise MESFET devices, each having a gate electrode corresponding to said control electrodes, respectively.
- 16. The mixer of claim 15, further including an insulated substrate and wherein said output circuit comprises a printed IF balun having a first foil element connected to said switching circuit and said RF signal source and a second foil element displaced from said first foil element on opposite sides of said insulated substrate for producing said IF output signal.

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- 18. A double balanced mixer comprising:
- a source of a symmetrical local oscillator signal;

a switching circuit controlled by said local oscillator signal, said switching circuit comprising first and second MESFET switches, each having a gate electrode connected to receive said local oscillator signal, an output terminal and a third terminal connected to ground;

said first and second MESFET switches being alternately turned on and off in response to said local oscillator signal;

a source of RF signal;

an insulated substrate; and

a printed output circuit having a wideband response for receiving said RF signal and connected to said switching circuit for producing a narrow band IF output signal comprising the frequency difference between said local oscillator signal and said RF signal;

said printed output circuit including a printed IF balun having a first foil element, in a parallel tuned circuit, connected across said output terminals and a second foil element, in a series tuned circuit, displaced from said first foil element on opposite sides of said insulated substrate.